

HP StorageWorks

Partitioning in an EBS Environment Implementation Guide

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Partitioning in an EBS Environment Implementation Guide

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About this guide

This guide provides information about tape library partitioning in an EBS environment.

Intended audience

This guide is intended for system administrators implementing an EBS configuration, who are experience with:

- Tape backup technologies and tape libraries
 - SAN environments and backup software
 - Fibre Channel technology
-

Prerequisites

Before beginning, be sure you have:

- Reviewed the EBS Compatibility Matrix
 - Properly installed and configured your EBS hardware per the *HP StorageWorks EBS Design Guide*
-

Related documentation

In addition to this guide, HP provides corresponding information:

- EBS Compatibility Matrix
- *HP StorageWorks EBS Design Guide*
- *HP StorageWorks SAN Design Guide*
- HP Blueprints
- Implementation guides for supported backup applications
- Installation guides for EBS hardware components

These and other HP documents can be found on an HP web site: <http://www.hp.com/go/ebs> or <http://www.docs.hp.com>.

Document conventions and symbols

Table 1 Document conventions

Convention	Element
Medium blue text: Figure 1	Cross-reference links and e-mail addresses
Medium blue, underlined text (http://www.hp.com)	Web site addresses
Bold font	<ul style="list-style-type: none">• Key names• Text typed into a GUI element, such as into a box• GUI elements that are clicked or selected, such as menu and list items, buttons, and check boxes
<i>Italics font</i>	Text emphasis
Monospace font	<ul style="list-style-type: none">• File and directory names• System output• Code• Text typed at the command-line
<i>Monospace, italic font</i>	<ul style="list-style-type: none">• Code variables• Command-line variables
Monospace, bold font	Emphasis of file and directory names, system output, code, and text typed at the command-line



WARNING! Indicates that failure to follow directions could result in bodily harm or death.



CAUTION: Indicates that failure to follow directions could result in damage to equipment or data.



IMPORTANT: Provides clarifying information or specific instructions.



NOTE: Provides additional information.



TIP: Provides helpful hints and shortcuts.

HP technical support

Telephone numbers for worldwide technical support are listed on the HP web site:
<http://www.hp.com/support/>.

Collect the following information before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Detailed, specific questions

For continuous quality improvement, calls may be recorded or monitored.

HP strongly recommends that customers sign-up online using the Subscriber's choice web site at
<http://www.hp.com/go/e-updates>.

- Subscribing to this service provides you with email updates on the latest product enhancements, newest versions of drivers, and firmware documentation updates as well as instant access to numerous other product resources.
- After signing-up, you can quickly locate your products by selecting **Business support** and then **Storage** under Product Category.

HP-authorized reseller

For the name of your nearest HP-authorized reseller:

- In the United States, call 1-800-282-6672.
- Elsewhere, visit <http://www.hp.com> and click **Contact HP** to find locations and telephone numbers.

Helpful web sites

See the following helpful web sites:

- <http://www.hp.com>
- www.hp.com/go/ebs
- <http://www.hp.com/go/storage>
- <http://www.hp.com/support/>
- <http://www.docs.hp.com>

1 Introduction

Overview of Enterprise Backup Solutions

Properly setting up a Fibre Channel storage area network (SAN) backup solution can be challenging. Typically components are purchased at different times and arrive separately, or the components are purchased from different vendors. Each piece of hardware arrives with its own documentation for setup and deployment. These challenges may require additional time and money. HP is committed to keeping these challenges to a minimum by providing the *HP StorageWorks Enterprise Backup Solution Design Guide* and this implementation guide.

History

HP engineering teams have developed a comprehensive approach to ensuring that all hardware, firmware, and software components are properly fitted into an Enterprise Backup Solution (EBS). The teams test the supported configurations and they have developed many Best Practices to follow when setting up your own EBS. The teams also test backup solution software and provide many Best Practices to ensure that your EBS runs at optimum efficiency.

Documentation goal

This guide is intended to address many of the integration issues that you may encounter when setting up your EBS and to provide suggestions for the best solution. This guide does not provide specific documentation for installing and configuring your data protection software or tape library hardware. You will be referred to the appropriate documentation when necessary.

Solution features

EBS with supported backup applications integrates data protection and archival strategies across multiple platforms and operating systems located on the same SAN. This solution provides for the interconnection of multiple heterogeneous servers to multiple tape backup devices using dynamic device sharing technology.

The servers can share one or more HP StorageWorks tape libraries interconnected through HP StorageWorks Fibre Channel SAN switches.

To determine the compatible hardware components for this system, go to the HP EBS Compatibility Matrix at:

<http://h18000.www1.hp.com/products/storageworks/tapecompatibility.html>

Solution components

- Server(s) containing Fibre Channel Host Bus Adapter(s)
- Fibre Channel SAN Switch(es)
- Router(s), such as the HP StorageWorks E2400-160 FC Interface Controller or the HP StorageWorks Network Storage Router E1200-160
- HP StorageWorks Interface Manager Card(s)
- ESL E-Series or ESL9000 Series Tape Library

Supported Operating Systems and platforms

The Enterprise Backup Solution (EBS) supports several operating systems and platforms.

Refer to the EBS Compatibility Matrix for a complete list of operating systems and platforms. Refer to the *HP StorageWorks EBS Design Guide* for detailed instructions on SAN configuration of each OS.

Why use partitioning in an EBS environment?

Partitioning allows you to create separate, logical tape libraries from a single tape library. Logical libraries (partitions) behave like a physical library to backup and restore applications. Using the advanced version of Secure Manager in conjunction with HP StorageWorks Command View ESL, you have the option of partitioning an ESL9000-Series or ESL E-Series library. In addition, partitioning provides the following benefits:

Mixed Media support

Partitioning a library enables the user to use mixed media in a library with various backup applications. A library can consist of multiple drive and media types. Similar drive types and media can be grouped together as one partition, with a maximum of six partitions.

Support for more than one backup application

Large data centers often use more than one backup application for backing up and archiving data. Library partitioning provides a practical way to share an enterprise-class library among two or more backup applications, eliminating the need to purchase separate libraries, autoloaders, or drives for each application. For more information about backup application support, refer to the EBS compatibility matrix found at <http://h18006.www1.hp.com/products/storageworks/tapecompatibility.html>.

Multiple SAN and Operating System support

An HP StorageWorks ESL9000 or ESL E-Series library can be shared without merging two SANs together. Library partitioning enhances this ability by segmenting the physical library into logical libraries that can be shared between two SANs and their respective backup application.



NOTE: To implement a multi-SAN shared library, an HP StorageWorks e2400-160 interface controller must be connected to the robotics controller. The ESL E-Series library ships with an e1200-160 router by default. An upgrade to an e2400-160 is required to implement this configuration. Contact an HP-authorized reseller for assistance.

2 Setting Up Partitioning in an EBS Environment

Before setting up partitioning in an EBS environment, consider the following:

- Partitioning is only supported with an ESL E-Series or ESL 9000 series libraries with an Interface Manager card installed.
- A proper Secure Manager license is needed to create partitions.
- An ESL E-Series or ESL9000 library can have up to six partitions. Each partition must have at least one drive and one slot, and can have no more than one robotic device (medium changer) assigned to it. Mailslots are optional.
- Tape drives and 'normal' slots can be placed arbitrarily, in any grouping, into any partition, with the following limitations:
 - Up to ten separate, contiguous slot 'ranges' (groups) can be assigned to a partition. A range is a slot or contiguous group of slots. For example, selecting slots 1-25 constitutes one range. Selecting slots 1, 6, and 22 constitutes three ranges.
 - Up to ten separate, contiguous drive 'ranges' (groups) can be assigned to a partition. A range is a drive or contiguous group of drives. For example, selecting drives 1-6 constitutes one range. Selecting drives 1, 3, and 6 constitutes three ranges.
- If you choose to partition your library, you must assign each of the library resources to a partition. Any devices that are not assigned to a partition are not seen by backup software.
- Creating and deleting partitions affects host access configuration. Deleting a partition removes mapping information for that partition.
- Partitions cannot be edited after they have been created. To make changes to a partition, you must delete and re-create it.

Load Port considerations:

- A load port, which is a collection of mailslots, must be selected as a whole to be in a single partition. The slots of a given load port cannot be divided among partitions.
- In an ESL9000, the load port is not configurable. It is always 'on' or available. The load port can be placed into a single partition.

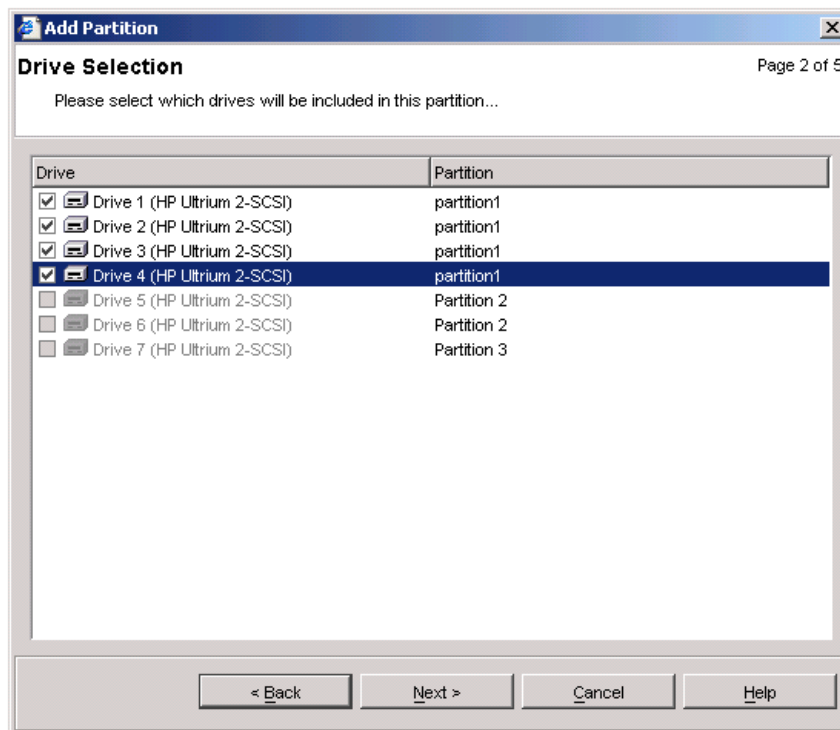
- In an ESL E-Series library, the load ports are configurable and can be configured as follows:
 - Off / allocated as normal slots
 - Left port on, right port on as normal slots
 - Right port on, left port as normal slots
 - Both left and right ports on

The left load port alone, the right load port alone, or both load ports can be placed in any given partition. Slots designated as 'normal' can be assigned to partitions arbitrarily.

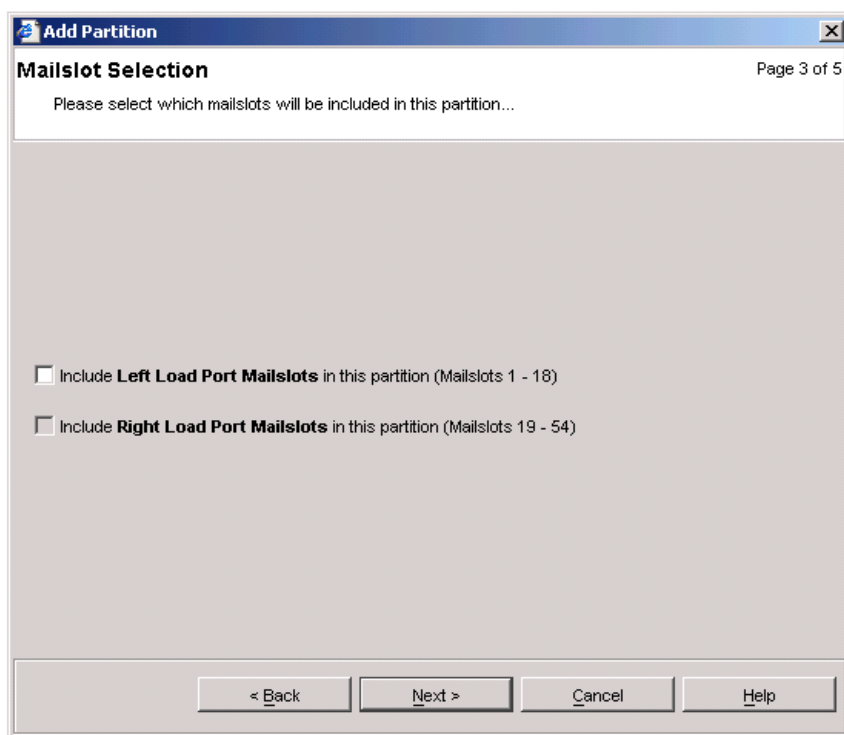
- In an ESL E-Series library, load port configuration is disabled whenever partitions are created. Partitions must be deleted or disabled before reconfiguring ESL E-Series load ports (ESL9000 load ports are not configurable).

Setting up partitioning

1. Make sure you are running the latest version of Command View ESL.
2. Install the correct Secure Manager license.
3. Start up Command View ESL and select the library you want to partition under the **Library Selection** tab.
4. Click the **Configuration** tab.
Partitioning should now show up in the left menu.
5. Click **Partitioning**.
6. Click the **Actions** pull-down menu, and then select **Add Partition**. This initiates the Partitioning setup wizard.
7. Give the Partition a name, and then click **Next**.



8. In the Drive Selection window, select the drives you want the partition to contain. Click **Next**.



Add Partition Page 3 of 5

Mailslot Selection

Please select which mailslots will be included in this partition...

☐ Include **Left Load Port Mailslots** in this partition (Mailslots 1 - 18)

☐ Include **Right Load Port Mailslots** in this partition (Mailslots 19 - 54)

< Back Next > Cancel Help

9. In the Mailslot Selection window, select the Load Port Mailslots you want the partition to contain. Click **Next**.



NOTE: In both the ESL9000 series and ESL E-Series libraries, there is a limitation to how many partitions can have access to mailslots. Only one in the ESL9000 and a maximum of two in the ESL e-series can have access to mailslots. This disables the mailslot feature for any partition that has no mailslots assigned to it.

Location	Status	Barcode	Partition
<input checked="" type="checkbox"/> Upper Left Panel	16 full slot(s)		
<input checked="" type="checkbox"/> Middle Left Panel	0 full slot(s)		
<input type="checkbox"/> Lower Left Panel	10 full slot(s)		
<input type="checkbox"/> Upper Right Panel	0 full slot(s)		
<input type="checkbox"/> Middle Right Panel	4 full slot(s)		
<input type="checkbox"/> Lower Right Panel	0 full slot(s)		
<input type="checkbox"/> Back Wall	0 full slot(s)		

10. In the Slot Selection window, select which slots you want in your partition. (Slots can be chosen by panel or individually). Click **Next**.

The following partition will be created:

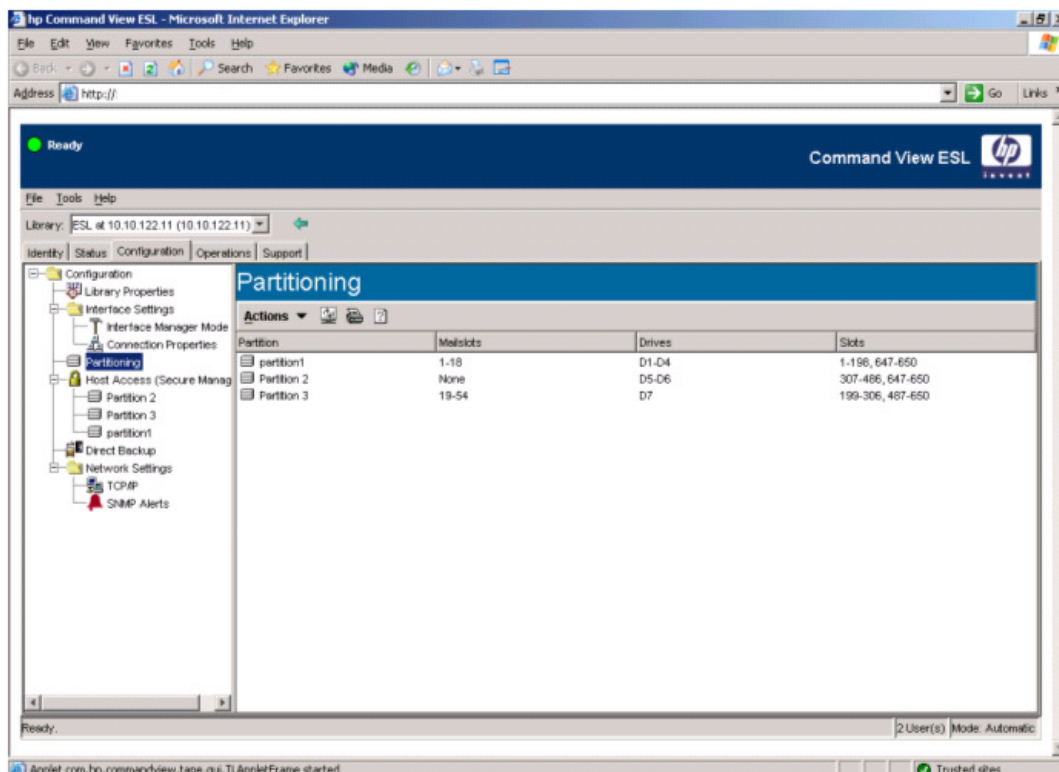
Partition Name: partition1
Drives: D1-D4
Mailslots: 1-18
Slots: 1-198

Please confirm your selections and click on the **Finish** button to create the partition.

11. Review and verify that the information on the confirmation screen is correct, and then click **Finish**.
 Your partition is now created and ready for access.

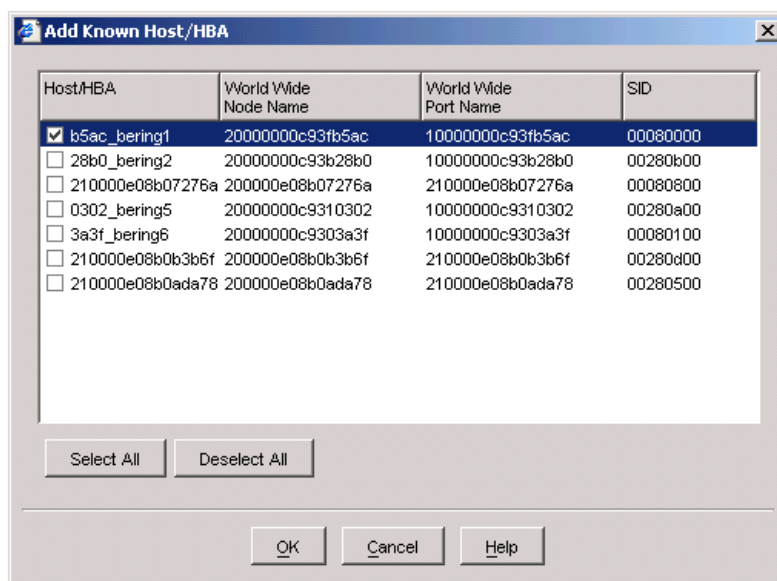
Configuring Host Access through Secure Manager

1. Partitions appear in the Host Access (Secure Manager) menu after you create them.

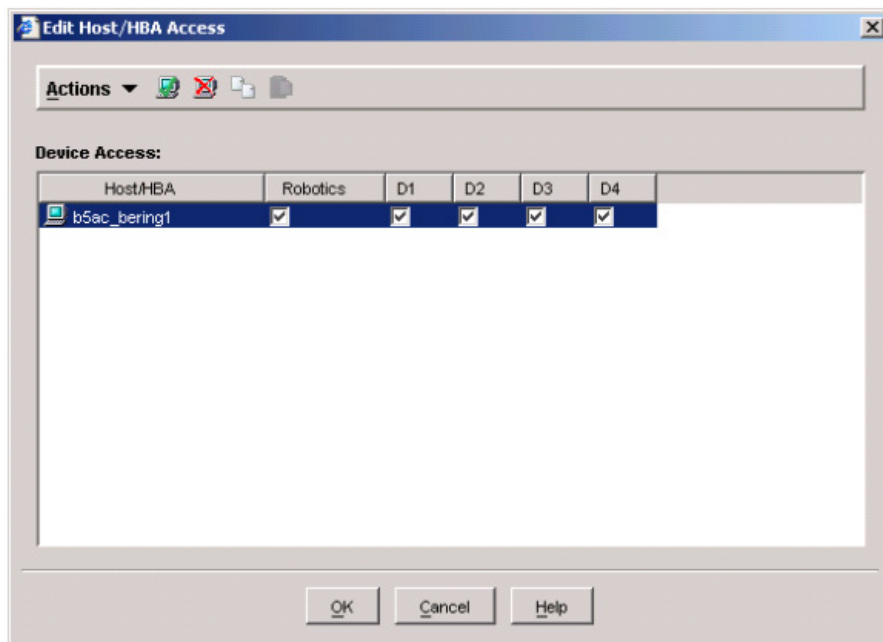


2. Click on the partition you want the host(s) to have access to.
3. Click the pull-down **Actions** menu and select **Edit Host/HBA Access...**
4. In the Edit Host/HBA Access window, click the pull-down **Actions** menu, and then select **Add Known Host/HBA...**

If hosts are zoned properly and can see the library, they should appear in the known hosts list).



5. In the Add Known Host/HBA window, select all hosts that require access to the partition. When you are finished, click **OK**.



6. By default, the selected hosts are given access to all devices in the partition. Access to individual drives within a partition can be modified in the Edit Host/HBA Access window.
 7. Click **OK** when finished. You are prompted with a Reboot Warning. Click **Yes** to continue.
- Your selected hosts now have access to the selected partitions.



NOTE: When deleting partitions, make sure all host access has been disabled.

3 Configuring the Backup Application

A partitioned library is presented to the backup application virtually the same way as a stand-alone library. Configuration is the same in most cases and a partition is as easy to configure with backup applications as a stand-alone library. There are a few caveats outlined below that detail any changes to configuring backup applications for use with a partitioned library. For more information on configuring backup applications in an EBS environment, refer to the *HP StorageWorks EBS Design Guide* and related application implementation guides found at <http://www.hp.com/go/ebs>.

Configuration notes

In most cases, configuration of partitioned libraries with backup applications is the same and requires no additional steps to implement. However, here are some tips for any backup application that will make the process easier.

1. Before attempting to configure the device for use with a backup application, create your partitions through Command View ESL as outlined in this document.
2. Verify that all hosts requiring access to the library or drives are granted access through Secure Manager within Command View ESL.
3. Verify that the Operating System sees the correct number and type of devices it has access to.
4. For most applications, configure the partitioned library automatically by using the device configuration wizard provided by the application. For more information on configuring devices via application wizards, consult the application's documentation.
5. Within the device configuration wizard, verify that the drives are being associated with the correct robotic device. If not, stop and consult the application's documentation.
6. If you have partitioned the library to implement mixed media, there is no need to configure and enable the application-based implementation of mixed media. The hardware is logically divided by device type.



NOTE: Because the robotic device is now a shared resource, certain long commands may cause the robot to be in use while other commands are sent to it. These commands are queued until the robotic operation is complete. It is possible that a command will have to be retried in the unlikely event that applications on each partition are executing long commands simultaneously. An example of a long command would be Legato's reset/inventory command.

Additional requirements for Legato NetWorker

Multiple servers can be configured to successfully “see” all devices from the OS perspective. However, when servers are configured to “see” and access all devices including multiple virtual robots, there's no way for Legato NetWorker to distinguish which devices belong to which “partitioned” library. This is because Legato NetWorker does not employ serialization or an automated configuration wizard for automation libraries. The tools Legato provides to assist are command line `inquire` and `jbconfig` utilities, which shows all devices and configures the libraries. However when you execute `inquire`, the displayed devices and corresponding “Bus/Target/Lun” combination does not associate a device with a particular partition. This requires configuration and presentation of one partition at a time through the Interface manager (IM). Use the following steps to configure multiple partitions with Legato NetWorker:

1. Configure one partition using the IM, presenting devices to servers.
2. Execute the Legato NetWorker `inquire -l` command on each server and capture pertinent (server name, device special file, device type, serial number) device information.
3. As a planning tool you should build a table from the `inquire` command output, sorted by serial number similar to the following example:

```
*****
HUL3C04854 acdc.entlab.ice scsidev@2.0.0:HP      Ultrium 2-SCSI      |Tape, /dev/rmt0.1
HUL3C04854 anya.entlab.ice scsidev@72.0.0:HP      Ultrium 2-SCSI      F43W |Tape, /dev/rmt/c72t0d0BESTnb
HUL3C04854 duloc.entlab.ice scsidev@4.5.0:HP      Ultrium 2-SCSI      F43W |Tape, /dev/ntape/tape15_d1
HUL3C04854 oslo.entlab.ice scsidev@7.5.0:HP      Ultrium 2-SCSI      F43W |Tape, \\.\\Tape8
HUL3C04854 raptor.entlab.ice scsidev@0.6.0:HP     Ultrium 2-SCSI      F43W |Tape, /dev/nst8
HUL3C04854 sunfire01.entlab.ice scsidev@3.0.0:HP  Ultrium 2-SCSI      F43W |Tape, /dev/rmt/0cbn
*****
HUL3C04875 acdc.entlab.ice scsidev@2.6.1:HP      Ultrium 2-SCSI      |Tape, /dev/rmt11.1
HUL3C04875 anya.entlab.ice scsidev@78.0.1:HP      Ultrium 2-SCSI      F43W |Tape, /dev/rmt/c78t0d1BESTnb
HUL3C04875 duloc.entlab.ice scsidev@4.2.1:HP      Ultrium 2-SCSI      F43W |Tape, /dev/ntape/tape10_d1
HUL3C04875 oslo.entlab.ice scsidev@7.2.1:HP      Ultrium 2-SCSI      F43W |Tape, \\.\\Tape3
HUL3C04875 raptor.entlab.ice scsidev@0.3.1:HP     Ultrium 2-SCSI      F43W |Tape, /dev/nst3
HUL3C04875 sunfire01.entlab.ice scsidev@3.5.1:HP  Ultrium 2-SCSI      F43W |Tape, /dev/rmt/11cbn
*****
HUL3C04881 acdc.entlab.ice scsidev@2.0.1:HP      Ultrium 2-SCSI      |Tape, /dev/rmt1.1
HUL3C04881 anya.entlab.ice scsidev@72.0.1:HP      Ultrium 2-SCSI      F43W |Tape, /dev/rmt/c72t0d1BESTnb
HUL3C04881 duloc.entlab.ice scsidev@4.5.1:HP      Ultrium 2-SCSI      F43W |Tape, /dev/ntape/tape16_d1
HUL3C04881 oslo.entlab.ice scsidev@7.5.1:HP      Ultrium 2-SCSI      F43W |Tape, \\.\\Tape9
HUL3C04881 raptor.entlab.ice scsidev@0.6.1:HP     Ultrium 2-SCSI      F43W |Tape, /dev/nst9
HUL3C04881 sunfire01.entlab.ice scsidev@3.0.1:HP  Ultrium 2-SCSI      F43W |Tape, /dev/rmt/1cbn
*****
```

4. Using the planning tool as described in 3 above, execute Legato NetWorker `jbconfig` command to configure your library for the defined partition.
5. Repeat steps 1 through 4 for each partition you are creating for configuration to Legato NetWorker, using all of the data gathered in steps 2 and 3 to discern which are the “new” devices you will configure for the iteration and partition you are configuring a new virtual library for.

Using Legato NetWorker reset/inventory commands

Occasionally users need to perform Legato NetWorker reset/inventory command to inventory library slot, media, device information. This command can be disruptive and if this command is executed on multiple partitions the following errors may be observed:

```
# nsrjb -j akulaIII_p1 -HEv
setting verbosity level to `1' hardware reset:
Jukebox handle being opened at port scsidev@77.0.1
hardware reset:
Jukebox handle being closed at port scsidev@77.0.1
Jukebox handle being opened at port scsidev@77.0.1
box_inventory:
Jukebox handle being closed at port scsidev@77.0.1
nsrjb: Jukebox error:  Fri 11:58:10 AM SJI Failure[0x      2c]: Unconditional re
tryable error
```

If there is a need to execute/reset/inventory, HP recommends that the command is executed for each partition one at a time permitting each to finish execution.

4 Additional configuration

Implementing Mixed Media on the ESL E-Series Tape Libraries

Mixed media configurations are supported in the ESL E-Series Tape Libraries.

Partitioning a physical library with mixed drive and media types allows the different types of media and drives to be logically separated. This hardware separation reduces the complexity of configuration within the backup application. Keeping the media and drives separated also greatly reduces the chance for media to be inserted or used in the wrong drive.

The ESL E-Series must meet the following minimum configuration to operate in a mixed media environment:

- Partitioning is required and must be enabled.
- The library must have Secure Manager ESL, which is needed to create partitions and manage the library and its mappings to hosts.
- Each partition and panel must have homogenous drive and media types. While drives can be mixed within a physical library, there must be only one drive interface type per drive cluster (i.e. SCSI vs. Fibre Channel).
- Both left and right loadports must be upgraded to have removable loadport capability prior to installing the mixed media conversion kit. This prevents libraries from having a combination of fixed and removable loadports.

Configuring for dual-SAN support

Setting up for sharing a library over two SANs:

1. Install an HP StorageWorks e2400-160 controller card for use with the robotic device.



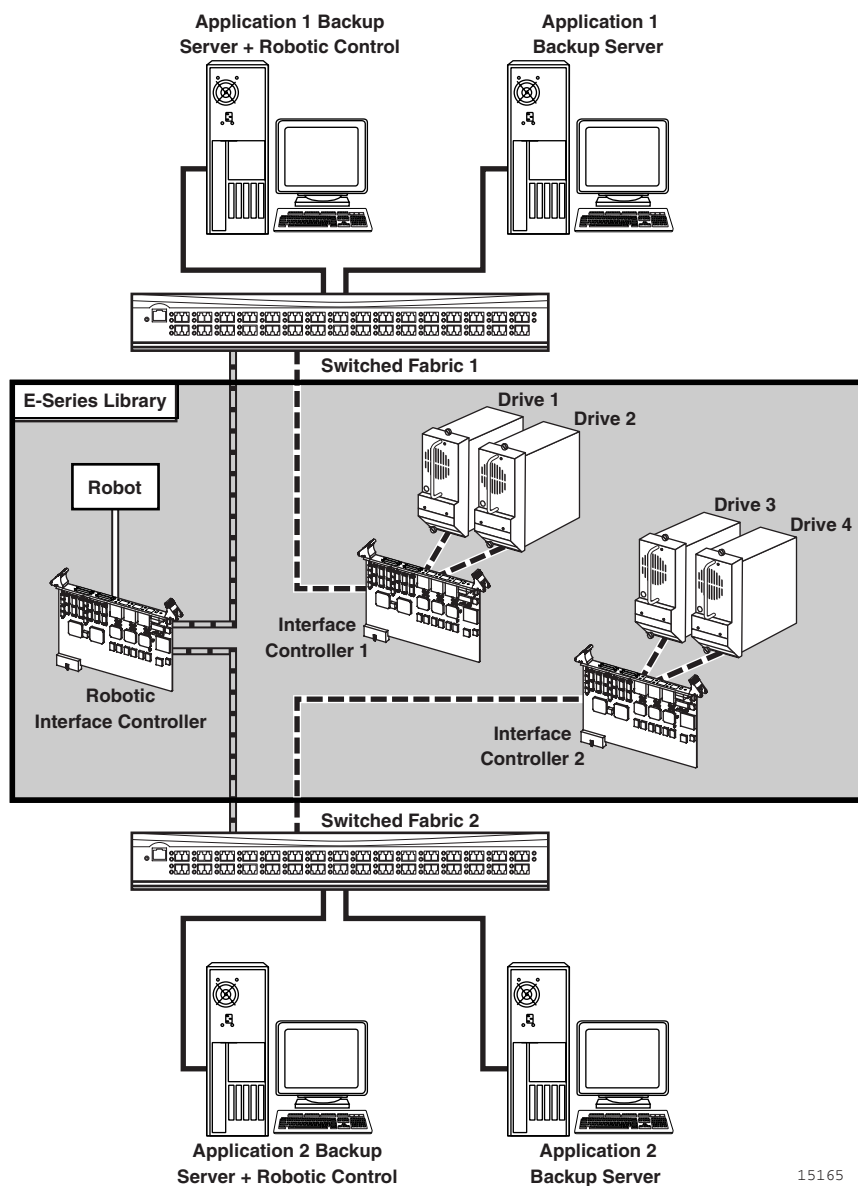
NOTE: To implement a multi-SAN shared library, an HP StorageWorks e2400-160 interface controller must be connected to the robotics controller. The ESL E-Series library ships with an e1200-160 router by default. An upgrade to an e2400-160 is required to implement this configuration. Contact an HP-authorized reseller for assistance.

- a. Because the e2400-160 controller card will be connected to two SANs, note which Fibre Channel port will be assigned to SAN 1 and which Fibre Channel port will be assigned to SAN 2. (See Figure 1).
2. Each e2400-160 supports up to four drives in a given cluster, so you will also need to assign drives to each SAN accordingly.
 - a. For example, in an eight drive library, SAN 1 will use e2400-160 card #1 that has physical access to four drives. Likewise, SAN 2 will use e2400-160 card #2 that has access to the remaining four drives. (See Figure 1).



NOTE: If connecting to one e2400-160 with two SANs, note which drives can be presented through each Fibre Channel port on the router. Because of the automated mapping algorithms, it may not be in the physical order they appear in the library.

3. Use HP StorageWorks Command View ESL to grant robot and drive access to hosts in each SAN. (See the previous section for steps on creating and setting up access with partitioning).
4. Verify that the host operating system detects the library and tape drives.
5. Install and set up the backup application.



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Figure 1 Example dual-SAN configuration

A Additional Resources

For additional information on implementing partitioning in an EBS environment, refer to the following web sites.

Enterprise Backup Solutions

<http://www.hp.com/go/ebs>

Click “Technical Documentation” to access the EBS Design Guide and implementation guides. Click “Compatibility and Tools” to access the EBS Compatibility Matrix.

Hardware

<http://h18006.www1.hp.com/storage/tapestorage.html>

Click on any product to view its specifications and other technical documentation.

